SIREQ TD
A Human Factors Approach to Canadian Soldier Modernization

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Defence Research and Development Canada
Recherche et développement pour la défense Canada
Canada

Presentation Overview

- Background and Context
- Project Overview
  - with sampling of results
- What Next?

Context: Soldier Modernization

- NATO and other nations around the world are embarking on “Soldier Modernization Programs”
  - US: Land Warrior/Future Force Warrior
  - UK: Future Integrated Soldier Technology (FIST)
  - FR: ECAD and FELIN
  - GE: Infanterist der Zukunft
  - AS: Land 125 Project Wundurra & SCS
  - NL: Soldier Modernization Program (SMP & D2S2)

CA: Integrated Soldier System Project (ISSP)

Soldier Information Requirements Technology Demonstration (SIREQ TD)

Defence R&D Canada – Toronto • R & D pour la défense Canada – Toronto

SIREQ TD Aim

To define and empirically validate the performance requirements for the future Soldier System by demonstrating capability enhancements in command execution, target acquisition, and situational awareness for the individual Canadian dismounted soldier in 2010-2015.

SIREQ TD

Lethality

C4I

Revolutionary Change

Evolutionary Change

Revolutionary Change

Evolutionary Change

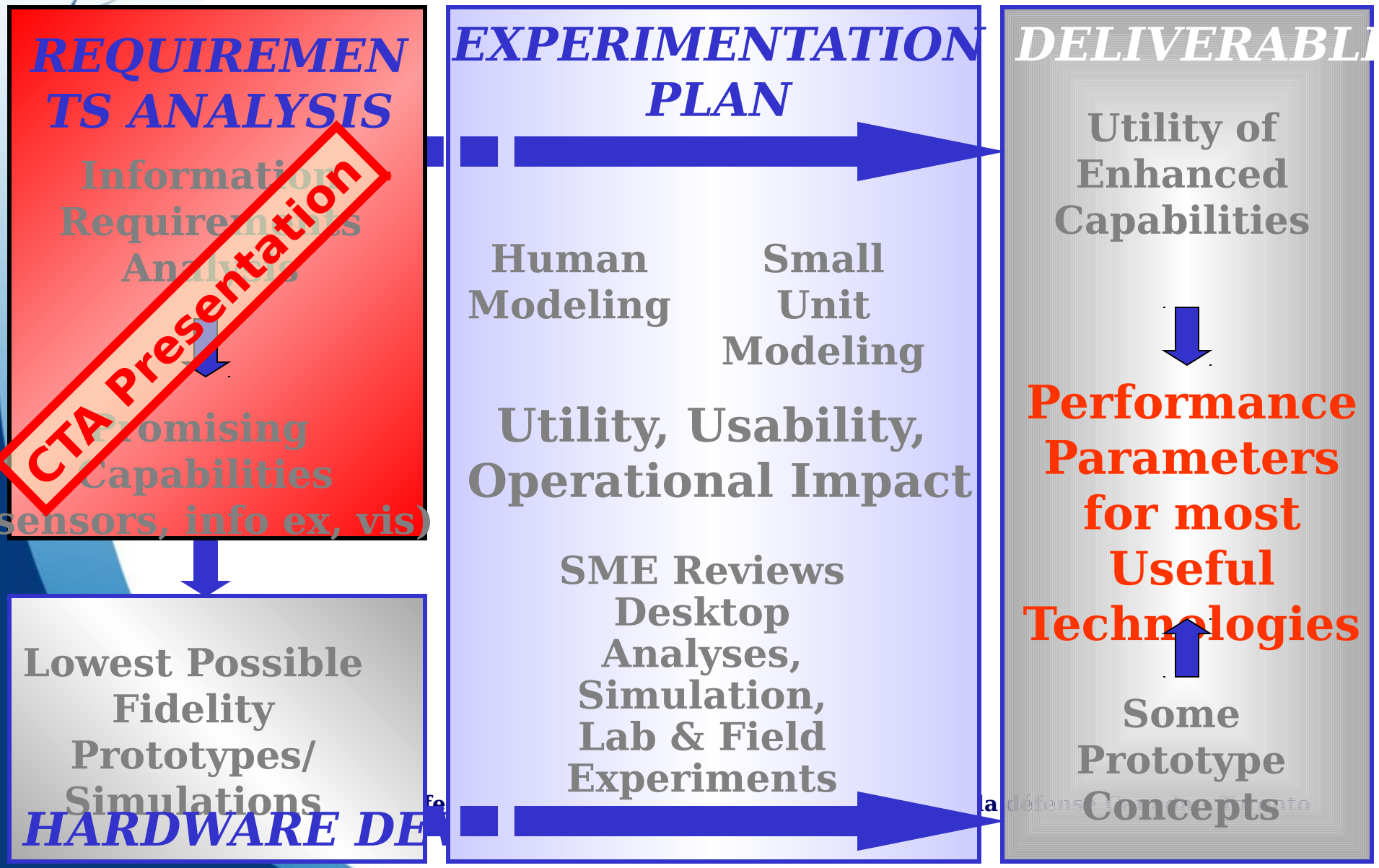
Survivability

Mobility

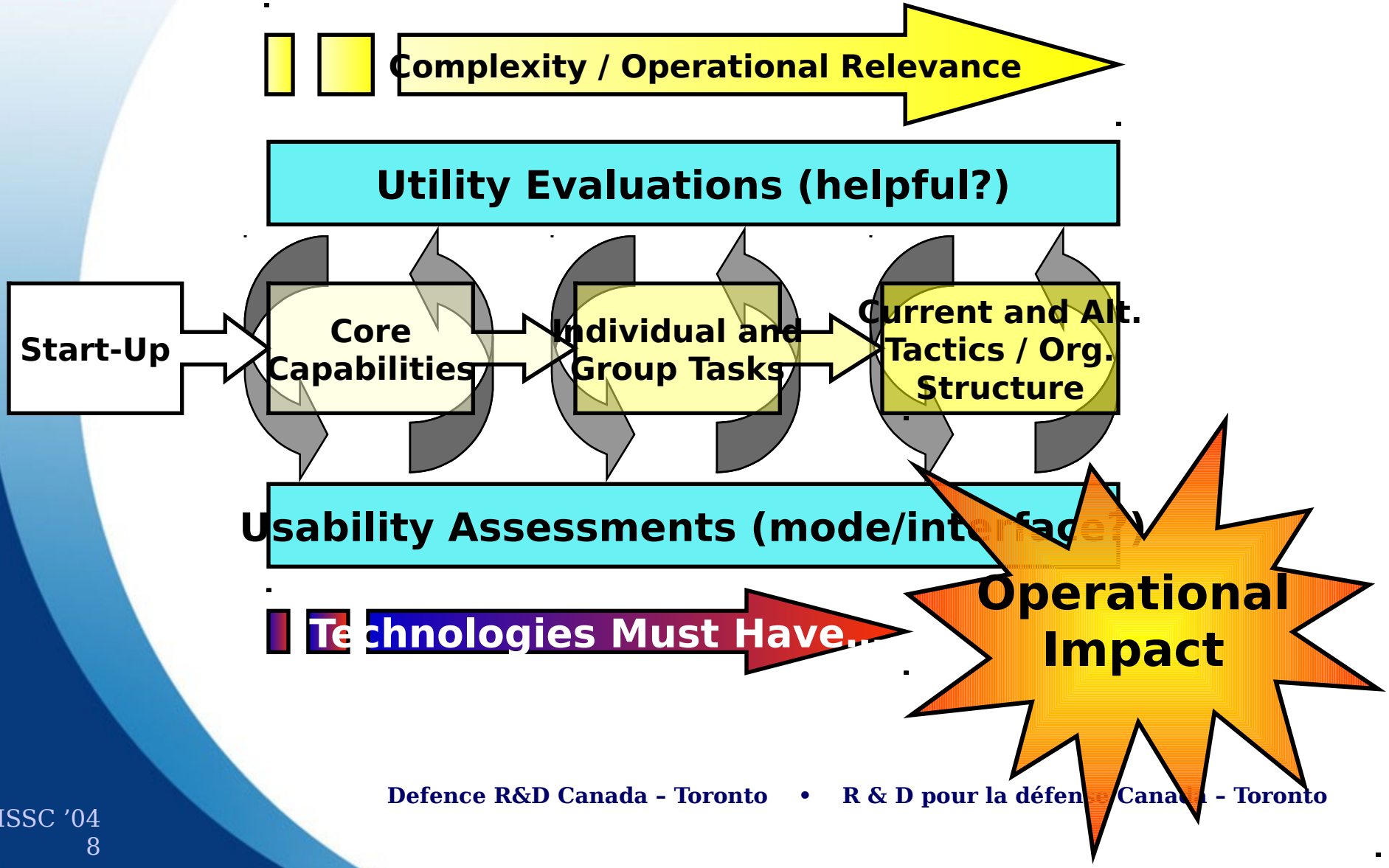
Sustainability

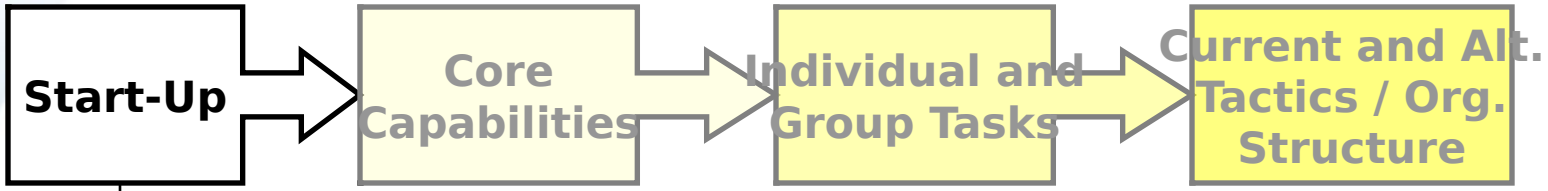
Clothe The Soldier

Framework for SIREQ Plan



Program Outline



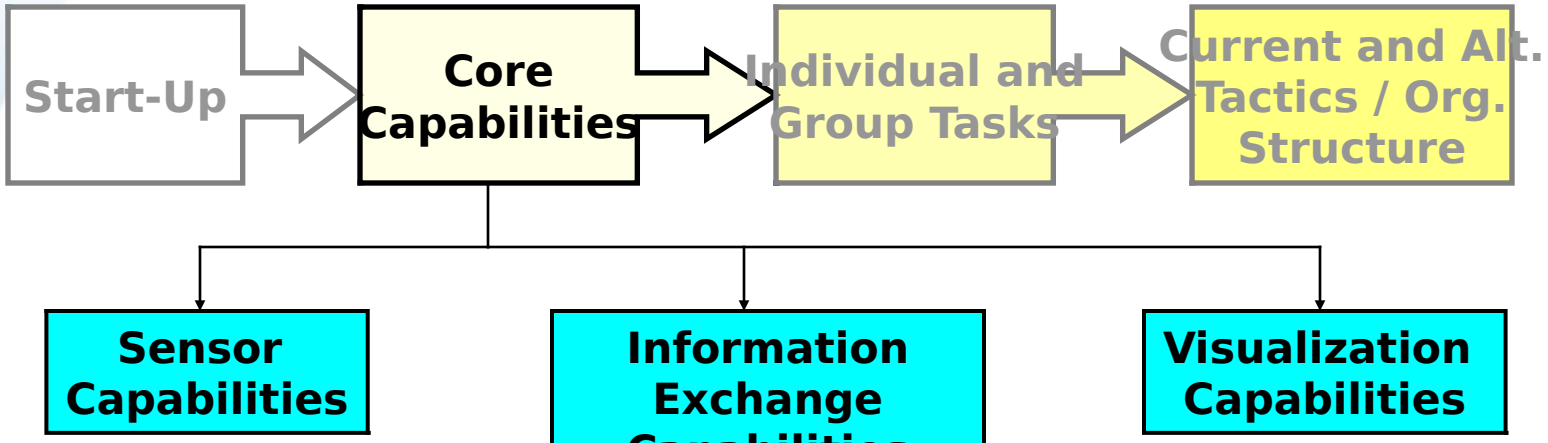


HF Measures

- Information Requirements
- Situation Awareness
- Command Decision Tree
- Team Decision-Making
- Trust
- Intent
- Learning and Creative Problem-S
- Operational Performance Measur
- Usability Measures
- Workload Measures

Preparation

- VR Simulation
- CAEn Modeling
- Natural Language Interface
- Sensor Suites
- SAT / IFT
- Visualization
- SST
- Detailed Experimental Plans
- Field Test Bed
- Weapon Test Bed



Sensor Capabilities

Personal Night Visio
- I2
- IR
- I2/IR Fusion

Visual STA:
- Weapon STA
- Visual Surveillance

Non-Visual STA:
- Auditory
- Motion/Radar/Other

Distributed Sensors
Sensor Fusion

Information Exchange Capabilities

Verbal:
- Simple/Complex

Non-Verbal:
- Simple/Complex
- Tactual
- Visual
- Auditory

Multi-Modal:
- Natural Language Interfa

Non-verbal Input Device
Multi-modal Capabilities
Battlefield Info Manager

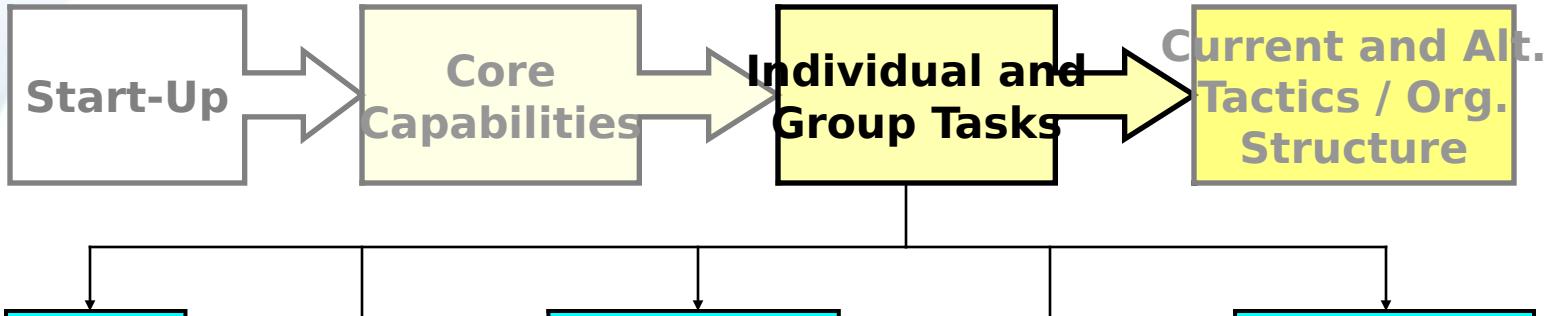
Visualization Capabilities

Terrain Modeling:
- In-building
- Urban Streets
- Open Country
- Terrain

Visualization

Local and Global Awareness:
- Tactical Fusion
- Info. Visualization

Inter-visibility Tool



Siting

- Site Enemy
- Info. Fusion
- OPs
- BCID
- Trenches
- Site Planning
- Range Car

Orders

- Planning
- Preparation
- Briefing
- Aide Memoires

Control of Movement

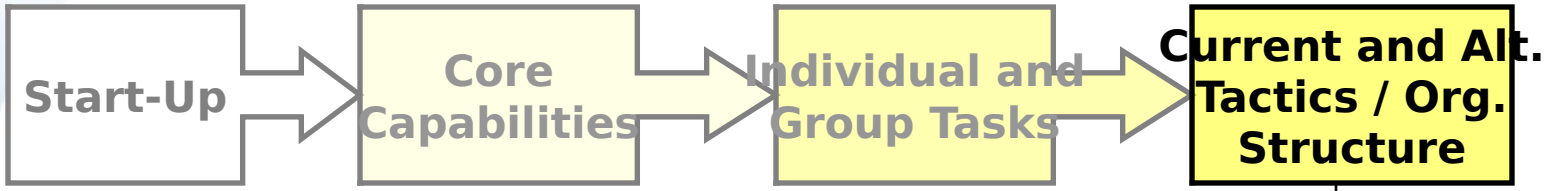
- Field Formations
- Formation Separation
- Tactical Movement
- Plan Movement
- Survivability

Control of Fire

- Plan Fire
- Fire Decision Aids
- Control Fire
- Section Status
- BCID

Navigation

- Route Planning
- Route Card
- Route Navigation
- In-building
- Urban Streets
- Open Country
- Way-finding



Missions

- Recce Patrol
- Fighting Patrol
- Peacekeeping Patrol
- Hasty Attack Ambush
- Advance to Contact
- Deliberate Attack
- FIBUA (streets)
- House Clearing

- React to Sniper
- Hasty Defence

Mission Environments

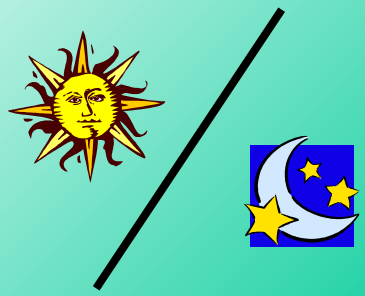
Open Country
- CAEn Simulation and Wargaming
- VR Simulation
- Field Trial

Urban Streets
- VR Simulation
- Field Trial

In-Buildings
- VR Simulation
- Field Trial

HF Studies: Conditions

Day vs Night



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Terrain

- In Building
- Urban Streets
- Open Country

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Role

- Section Comd
- Rifleman

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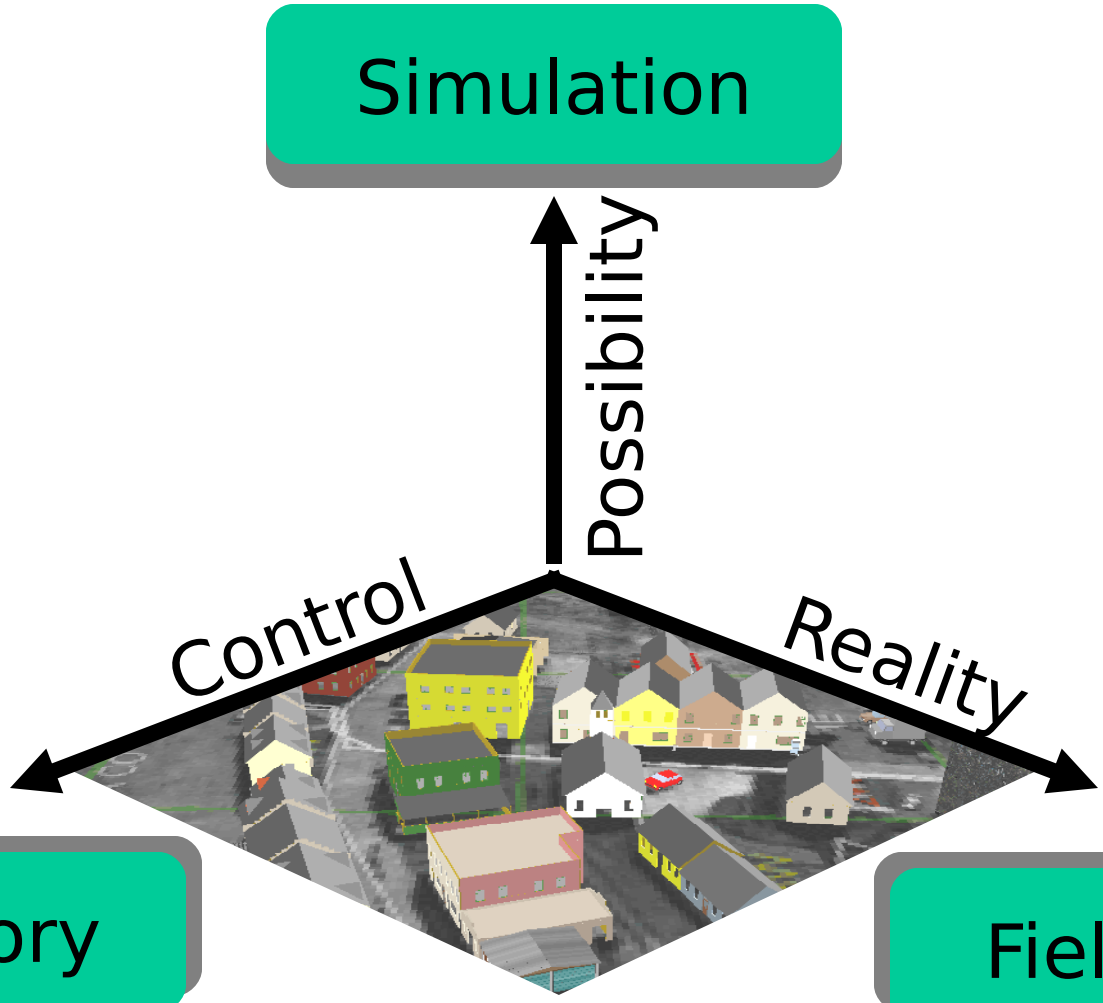
Alternative Organization & Tactics

SIREQ TD Experimentation

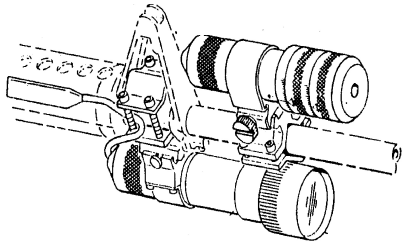


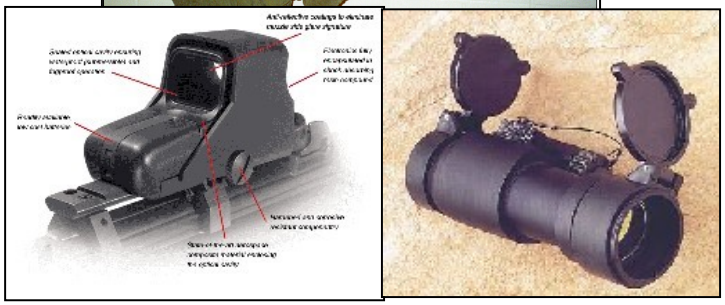
COTS/MOTS/Prototype Sensors & Sights

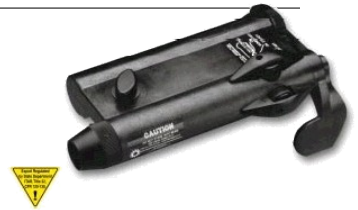
Off-Bore

Night Vision Syste

Aiming Aids

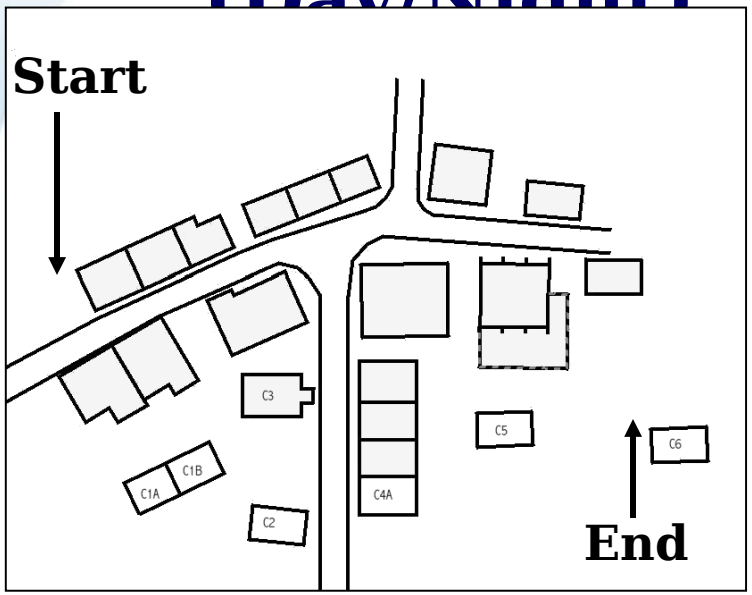






Weapon Sights

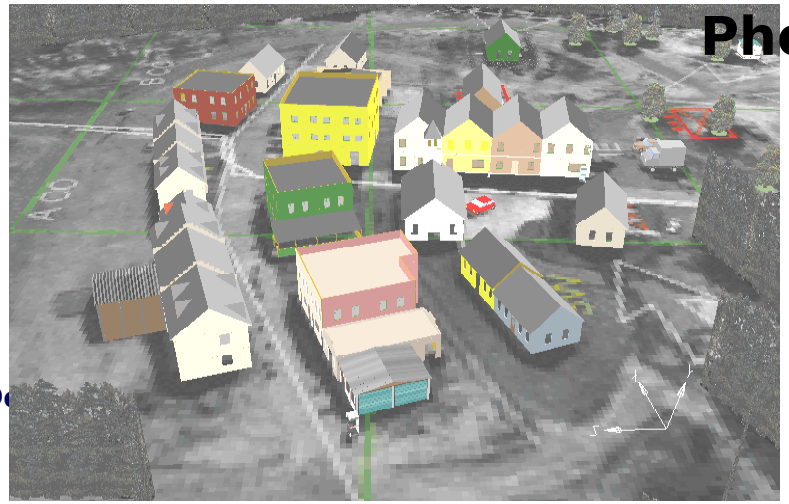
Experiment Example: Urban Visualization (Street) (Day/Night)



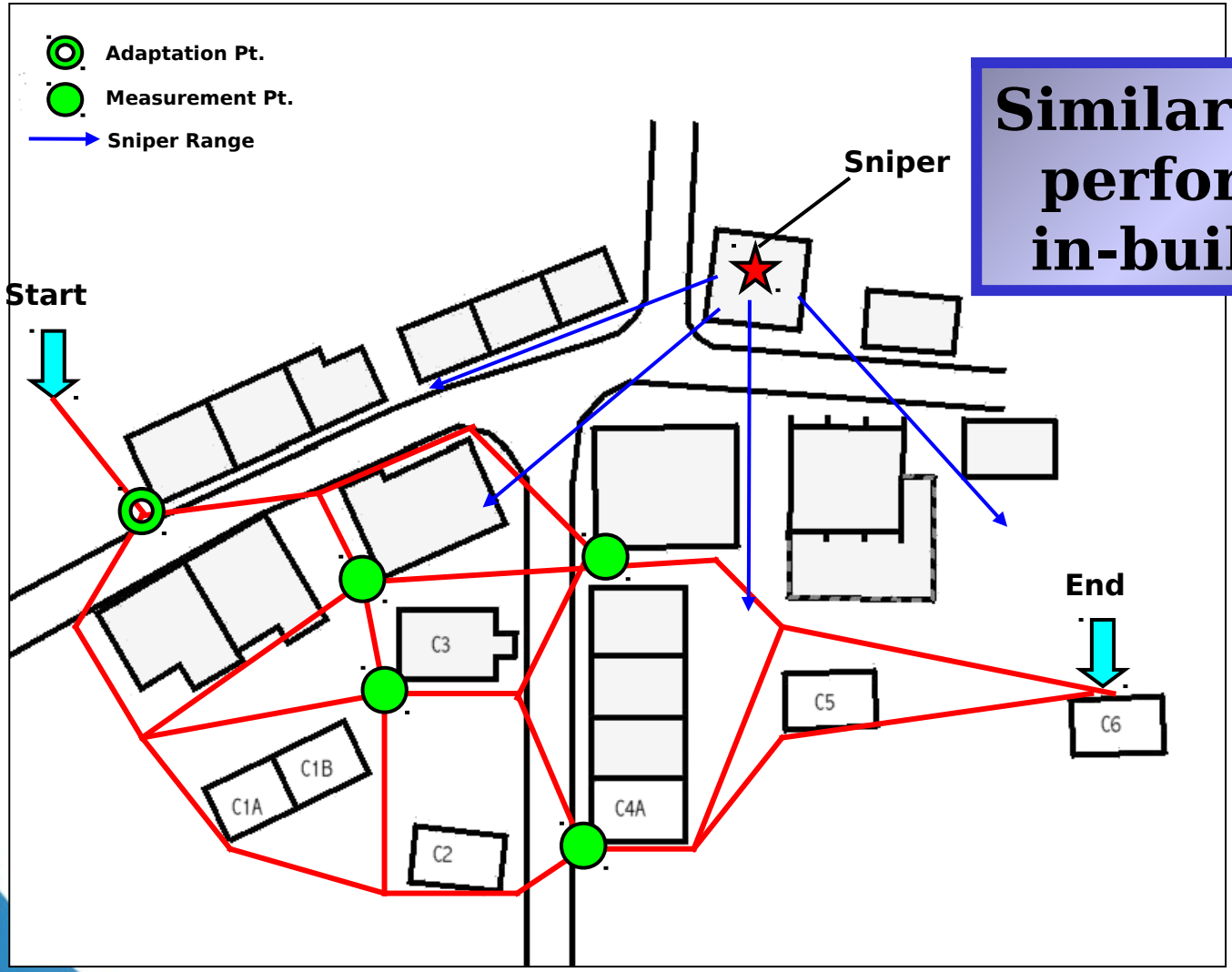
2D Map

Aerial Photograph

3D Fly-through

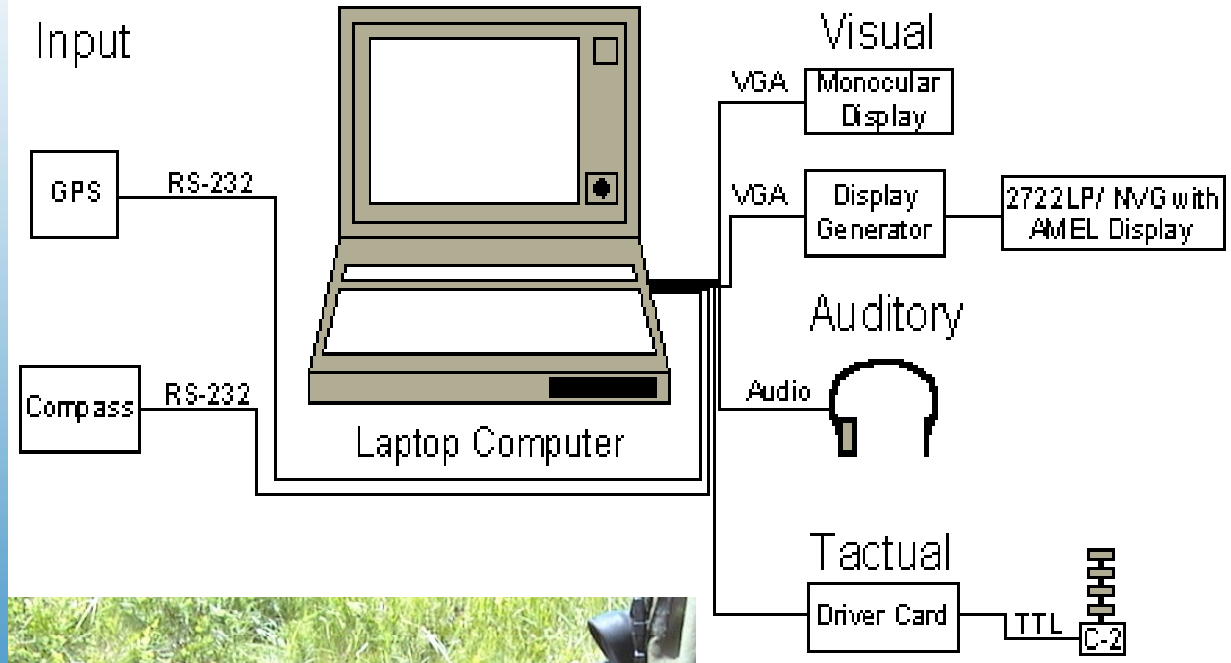


Urban Visualization (Street) (Day/Night)

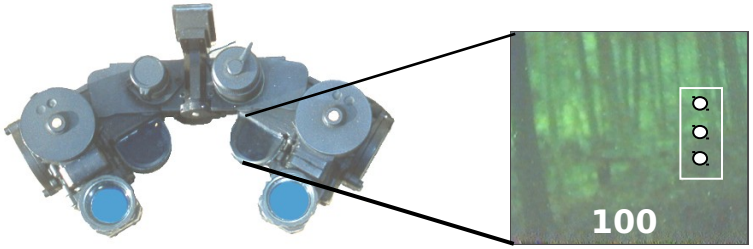


Similar study performed in-building

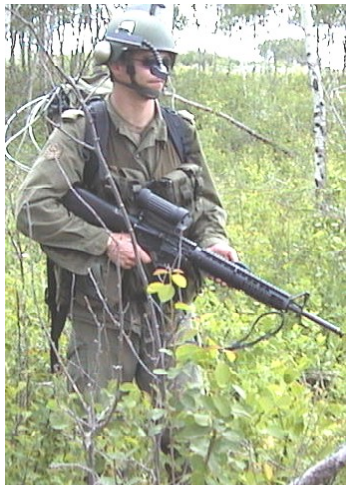
Future Infantry Navigation Device (FIND)



Modalities



Tactual

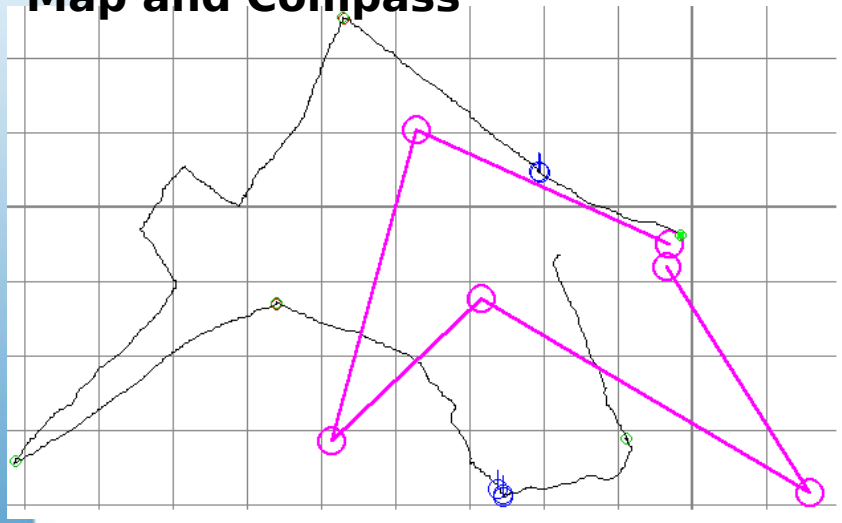


Visual

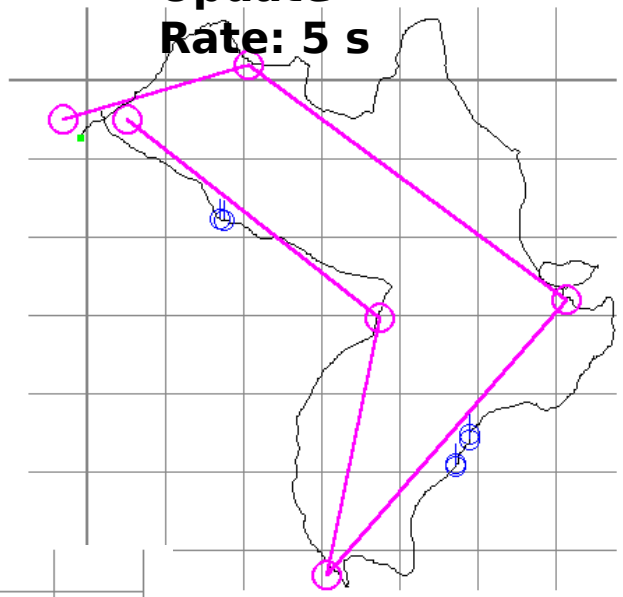
Auditory

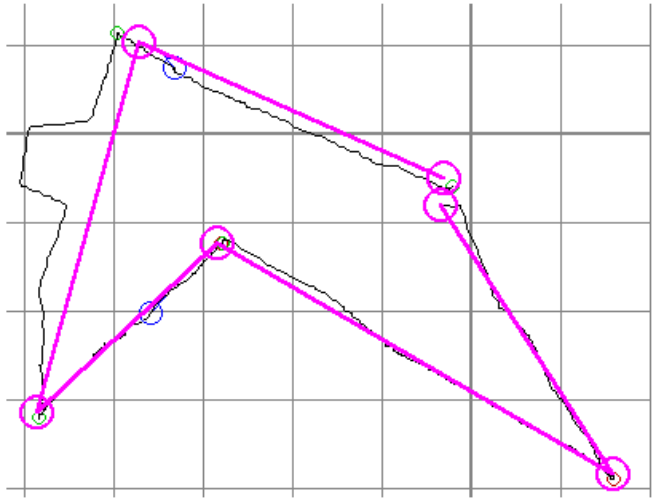
Sample Navigation Results

Map and Compass



Update Rate: 5 s



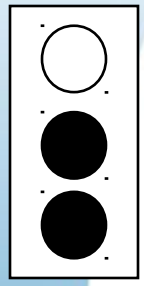


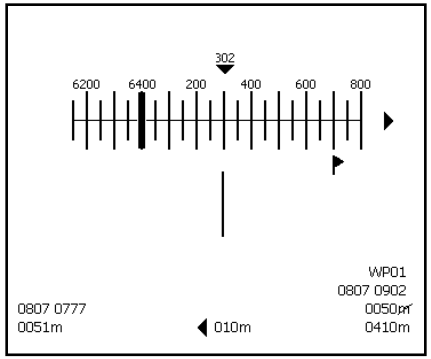
Defen

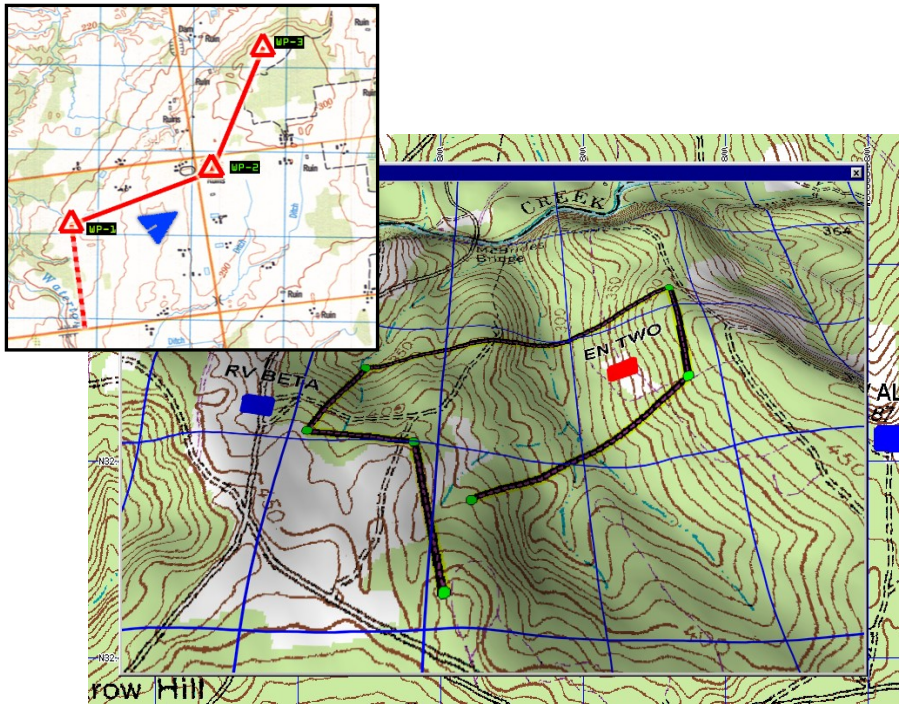
FIND and Tablet Display

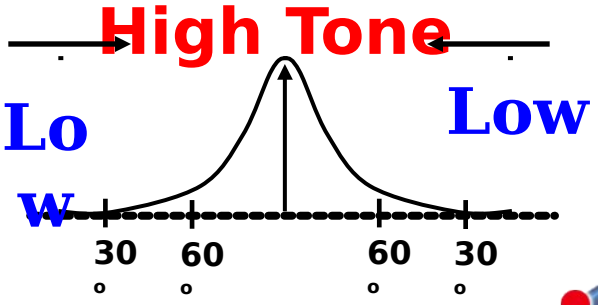
Update Rate: 0.1 s

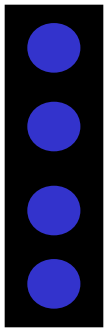
Modality/Interface Issues Studied

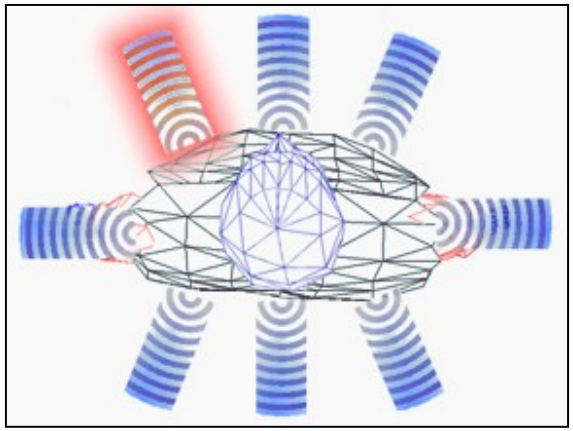


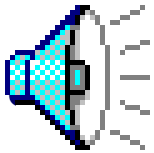






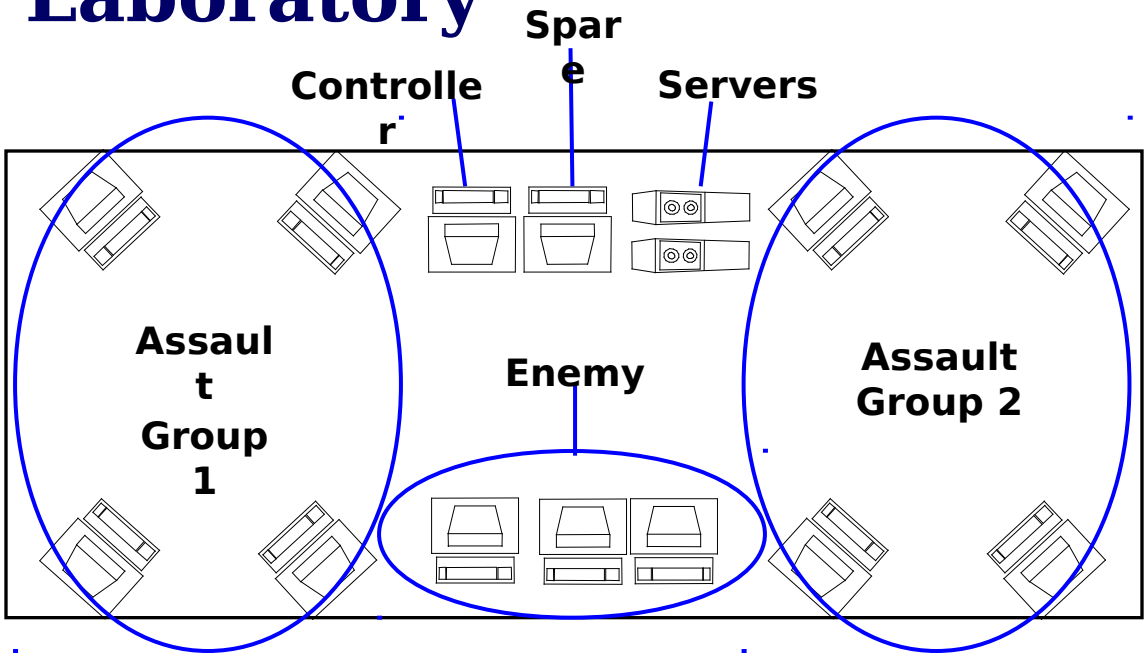




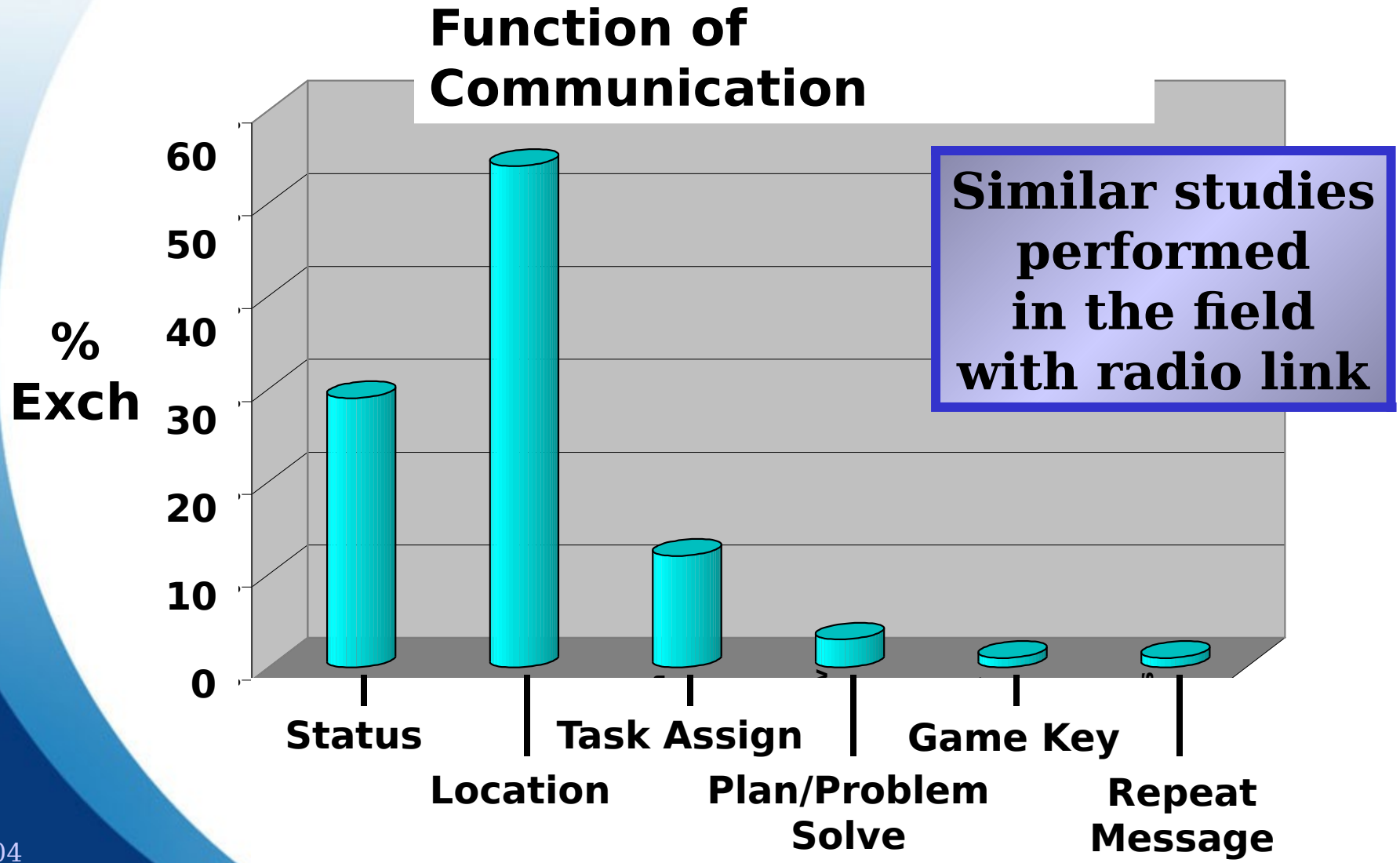


Defence R&D

Information Exchange: FPG Laboratory



Communications Traffic



SIREQ Summary

- Canadian SMP approach is somewhat unique among international programmes; producing ***66 study reports***
- R&D project focussed on ***why*** technology, rather than ***what*** technology
- Strong HF component addressing ***utility*** and ***usability***
- Will generate performance specs for those technologies that provide ***revolutionary*** rather than ***evolutionary*** enhancements in capability
- Recommended technologies ***must have an effect on mission outcome***

DEFENCE R&D DÉFENSE

Soldier Integrated Headwear System Technology Demonstration (SIHS TD)

Defence Research and Development Canada
Recherche et développement pour la défense Canada
Canada

SIHS TD Aim

To empirically validate and demonstrate the most promising headwear integration concept that significantly enhances the survivability and effectiveness of the future Canadian dismounted soldier

by demonstrating novel concepts for integrating enhanced protection, sensing, information display, and communications technologies into a headwear system.

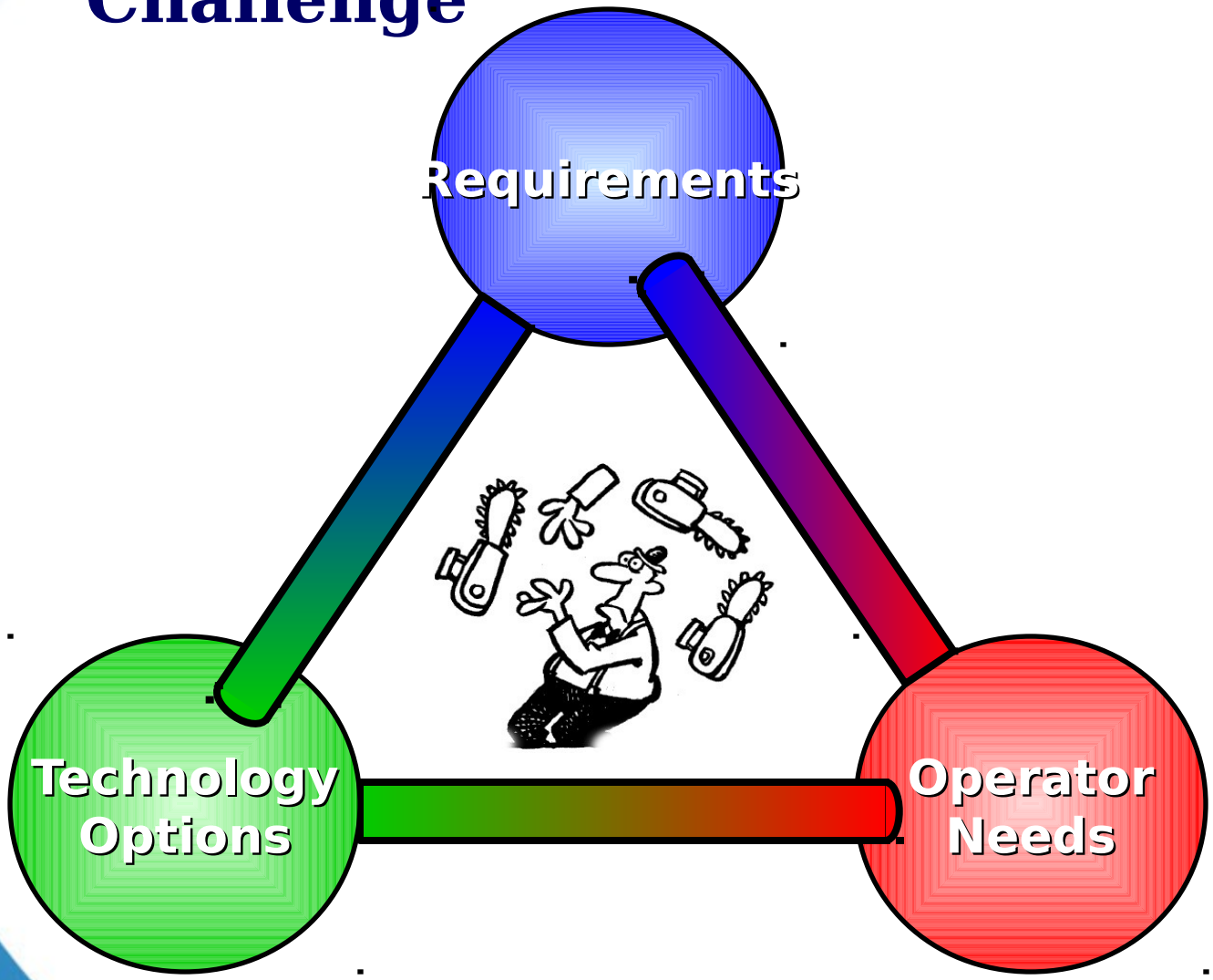
Technology Concepts

SIHS TD will demonstrate **three technology concepts** that represent **different levels of integration** in a headwear system for dismounted soldiers:

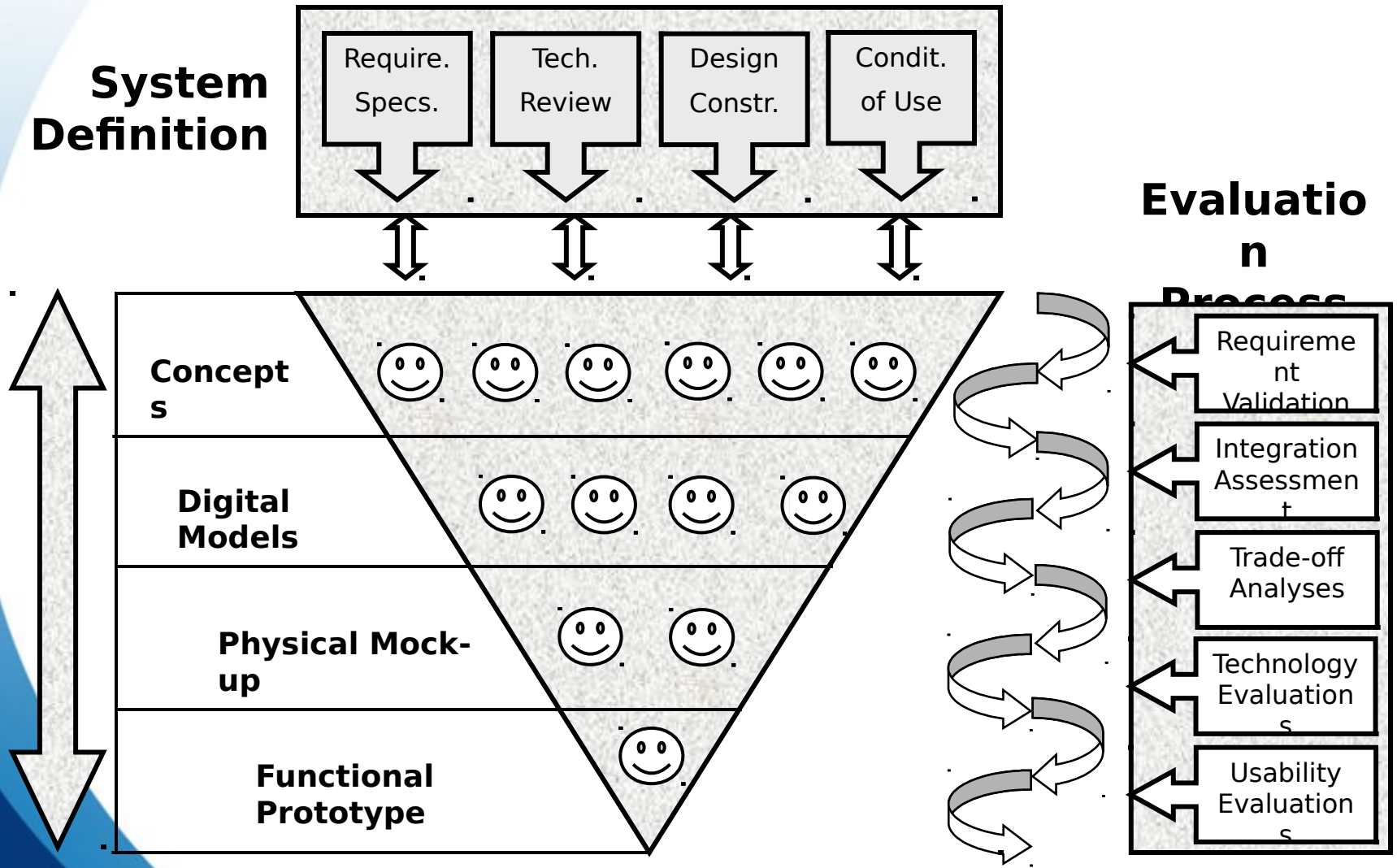
- Combined Helmet Components and Mask
- Modular System
- Permanently Encapsulated System

Strong HF emphasis in program

Complex System Integration Challenge



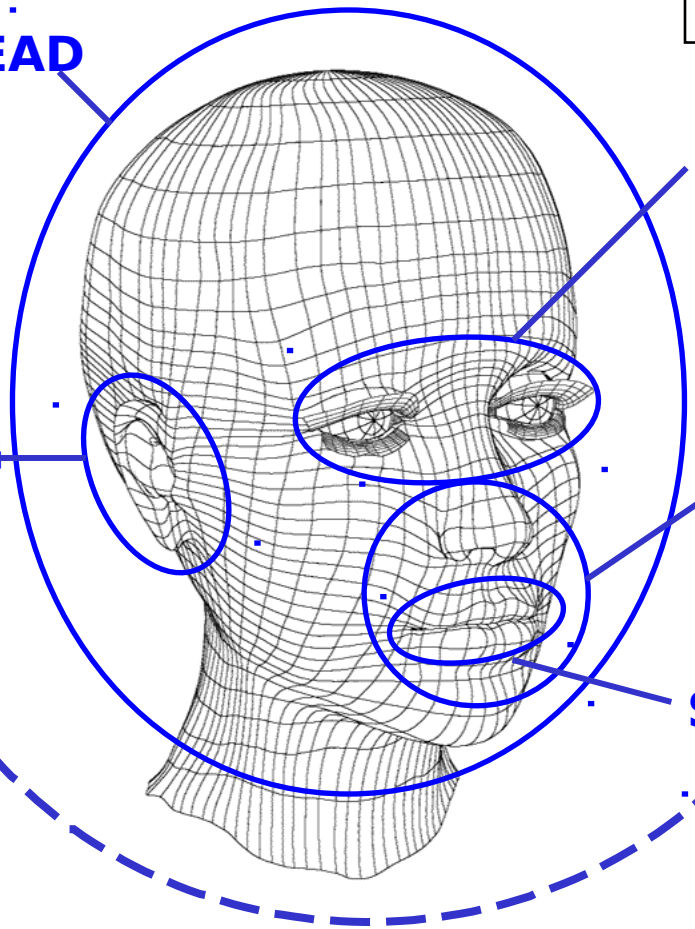
Detailed SIHS Process



Technical Requirements

A System of Sub-Systems

Function vs. Spac



HEAD

Protection
Thermal Comfort
Physical Comfort
Fit/Adjustability
Power / Data
Detectors

VISION

Protection
Local Awareness
Visual Displays
Enhanced Vision

HEARING

Protection
Local Awareness
Auditory Displays
Enhanced Hearing

RESPIRATORY

Protection
Ventilation

SPEECH

Voice Comms
Speech Input

Defence R&D (

SIHS TD Summary

- Multi-disciplinary, multi-lab R&D project with industry involvement
- Strong HF focus
- Objective is to ***identify the most suitable integration concept*** that should be pursued by the Army
  - NOT aiming to deliver a prototype (but that would be a bonus)

Contact Information

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Canada